Effects of Supplemental Feeding on Breeding Season Home Ranges and Resource Selection of Northern Bobwhites

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INTRODUCTION

Application of supplemental feeding along a dedicated feed trail is a widely used management practice, especially for southeastern hunting properties

Feed trail: 2-track tractor trail through uplands

INTRODUCTION

- Previous research has focused on supplemental feeding during the nonbreeding season
- Results are mixed on effects to home ranges:
  - Sisson et al. (2000) and Haines et al. (2004) reported:
    - Smaller home ranges
    - More localized movements
    - Shorter foraging times
  - Buckley et al. (2015) and Miller et al. (Quail 8) observed:
    - No significant impact on home range size
    - Home ranges shifted to include a reliable food resource
    - Within home ranges, supplemental feed trail was a minor use

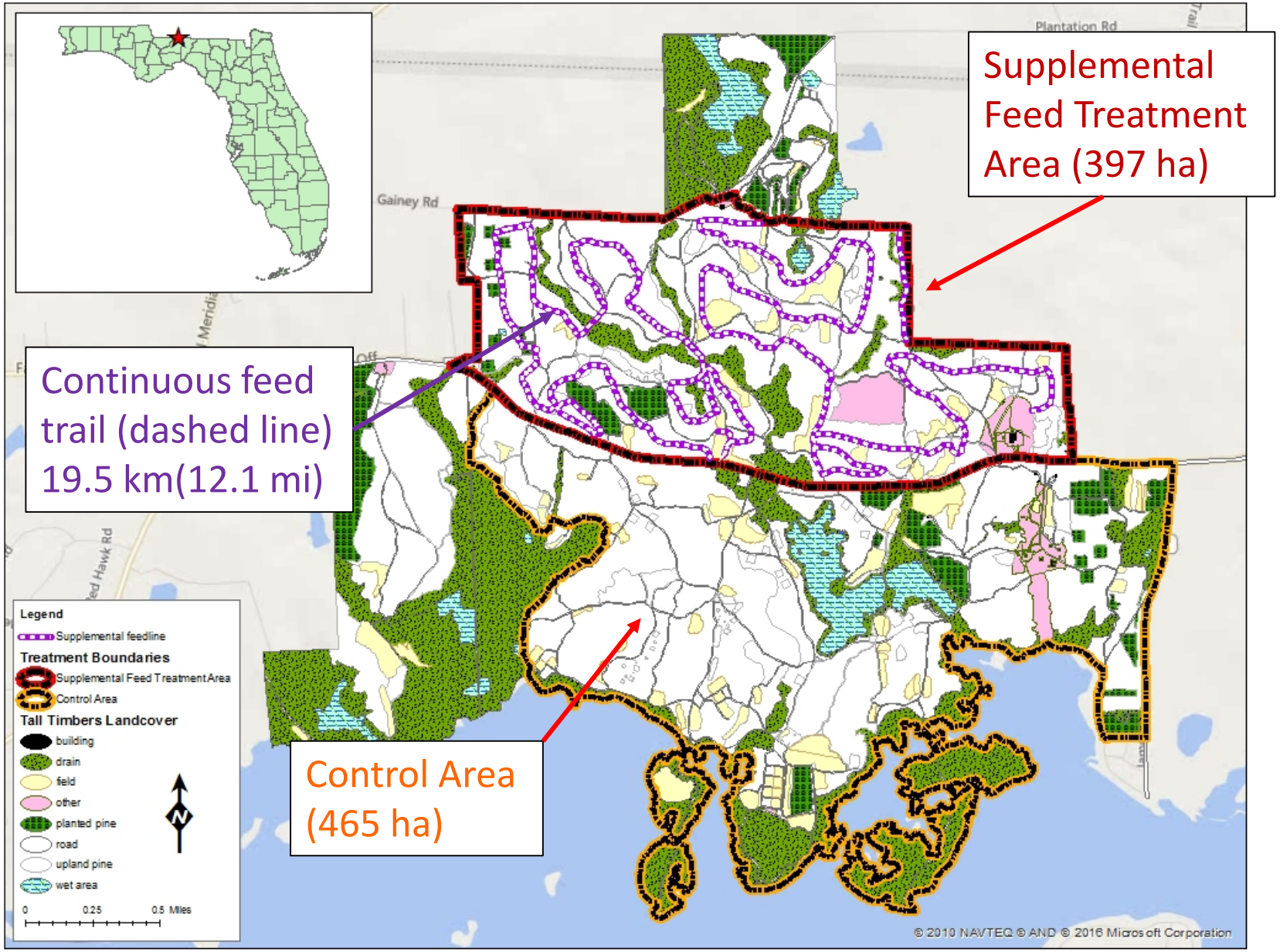
OBJECTIVES

- Supplemental feeding impacts may be different during the breeding season:
  - Food abundance and type much different
  - Habitat availability and suitability changes due to prescribed fire
  - Differences between the early and late breeding season
- Goal for this research:
  - Determine impacts of supplemental feeding on home range size during early and late breeding season
  - Estimate 2nd and 3rd order habitat and resource use selection on supplemental feed treatment areas
  - Complete a proximity analysis for quail locations on supplemental feed treatment areas

STUDY AREA Tall Timbers Research Station 1,568 ha (3,900 ac.)

- 66% upland pine (burned and unburned), 17% hardwood drain, 13% annual weed fields, 3% feed trail area, & 1% other
- Prescribed fire applied on a 2 year interval, 2 - 40 ha patch sizes

Treatment Areas



Application of supplemental feed

- Spread using a tractor and pull behind spreader
- Feed spread every 2 weeks, year around
- 1,651 kg (1.81 tons, 65 bushels) spread evenly along the feed trail every 2 weeks
- Feed rate: 85 kg/km (5.4 bu/mile)

Feed trail density goal:

- 2.4 km of feed trail per 40.5 ha of habitat

  (1.5 miles of feed trail per 100 acres)

Milo scattered along the feed trail

METHODS

- 7 Year Study: 2001 – 2007
- Jan. – March, bobwhites trapped and radio-tagged
- Transmitters distributed at ratio: 1:4 male to female
- 100 – 200 transmitters distributed each spring
- Radio-tagged birds tracked 3 – 5 times/week thru breeding season (15 APRIL – 1 OCTOBER)
- Location type recorded (nest, brood, etc.)
- All locations were mapped and recorded in a GIS
- Technicians attempted to confirm macro-habitat, feed trail use, and treatment area for every location

Data Analysis

- Breeding season was divided into early and late seasons
  - Early: 15 April –30 June
  - Late: 1 July – 1 October
- Home range calculations
  - Fixed kernel home range using a median bandwidth *(h)*
- Resource selection:
  - Macro-habitats and feed trail mapped each year
    - 1) unburned upland pine, 2) burned upland pine, 3) field, and 4) hardwood drain
    - Feed trail area: 5 m buffer on each side (10 m total) (2-3% of study area)
  - Compositional analysis for 2nd and 3rd order resource use
- Proximity Analysis: compared distances between locations to random points within each home range

RESULTS (2001 – 2007)

Sample Size: 835 home ranges (using 42,594 locations)

	FED AREA	CONTROL
EARLY	206	346
LATE	108	175

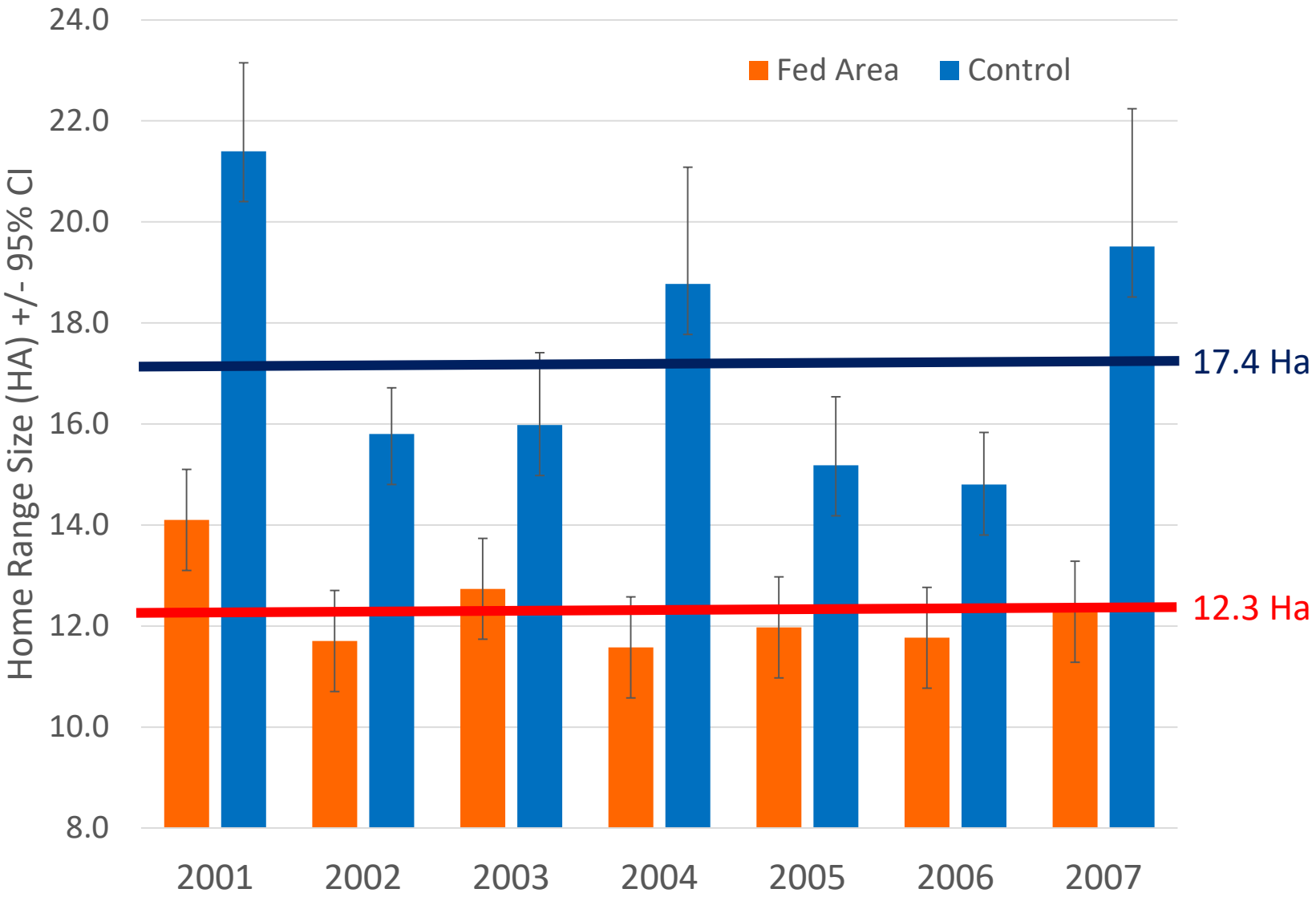
Average locations per radio-tagged bobwhite

- Early Breeding Season: 49.2
- Late Breeding Season: 53.8

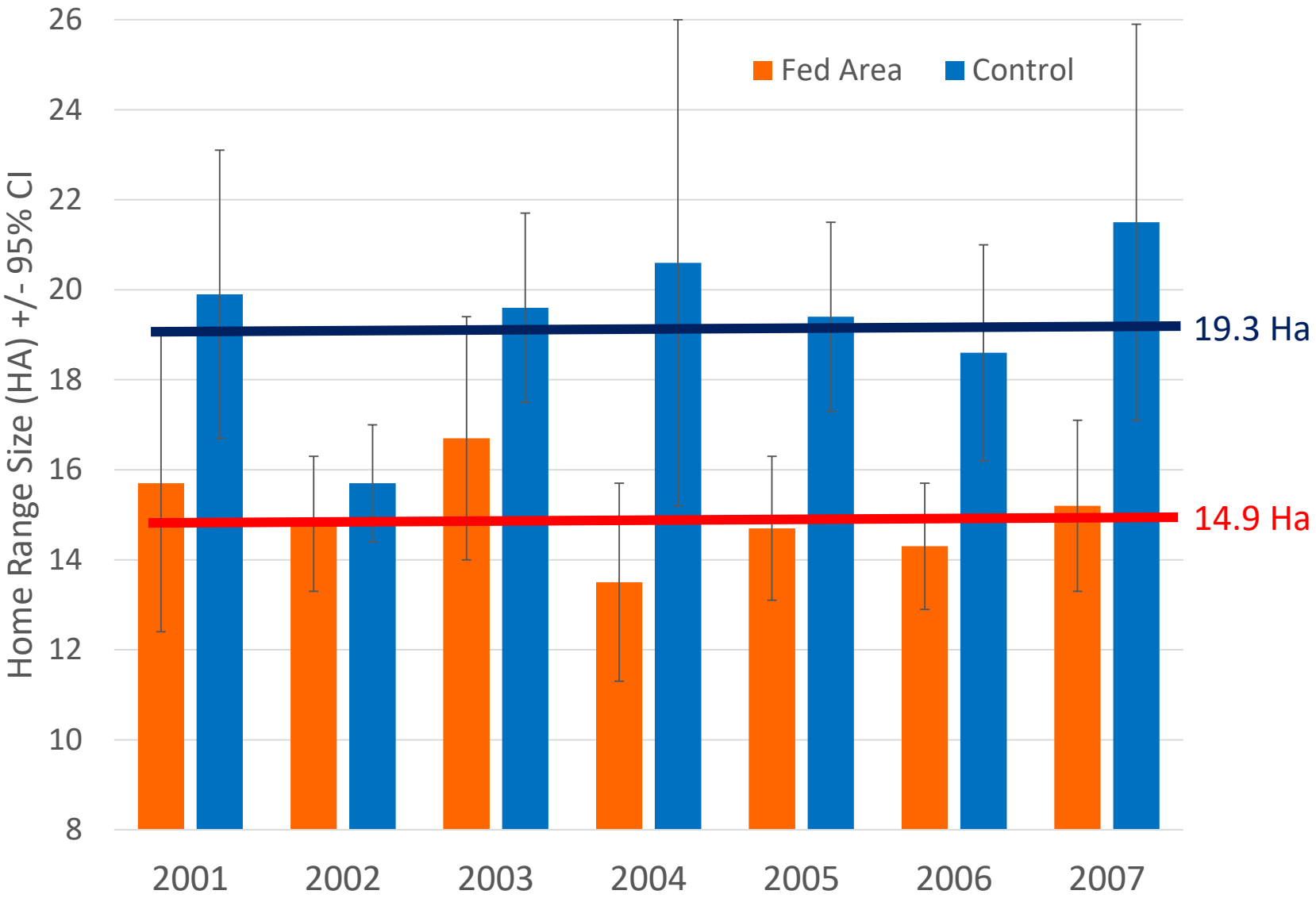
Feed trail lengths within home ranges of treatment area

- All bobwhite home ranges included a portion of feed trail
- Early Breeding Season: Ave: 582 m (range 36 – 1,631 m)
- Late Breeding Season: Ave: 710 m (range 136 – 1,433 m)

Results: Early Breeding Season Home Range



Results: Late Breeding Season Home Range



2nd Order Selection EARLY Breeding Season

	n	High Rank								Low Rank
2001	12	**feed trail buffer area**	>	unburned upland pine	>	burned upland pine	>	field	>	hardwood drain
2002	39	**feed trail buffer area**	>>>	burned upland pine	>	unburned upland pine	>>>	field	>	hardwood drain
2003	23	unburned upland pine	>	**feed trail buffer area**	>	burned upland pine	>	field	>>>	hardwood drain
analysis not completed for 2004										
2005	29	**feed trail buffer area**	>>>	unburned upland pine	>	burned upland pine	>>>	field	>	hardwood drain
2006	44	unburned upland pine	>	**feed trail buffer area**	>	burned upland pine	>>>	field	>	hardwood drain
2007	28	unburned upland pine	>	**feed trail buffer area**	>>>	hardwood drain	>	burned upland pine	>	field

3RD Order Selection EARLY Breeding Season

	n	High Rank								Low Rank
2001	12	unburned upland pine	>	burned upland pine	>	**feed trail buffer area**	**>>>**	field	>	Hardwood drain
2002	39	burned upland pine	>	unburned upland pine	**>>>**	hardwood drain	>	**feed trail buffer area**	>	field
2003	23	unburned upland pine	**>>>**	burned upland pine	**>>>**	**feed trail buffer area**	>	hardwood drain	**>>>**	field
2005	29	unburned upland pine	>	burned upland pine	**>>>**	**feed trail buffer area**	**>>>**	field	>	hardwood drain
2006	44	unburned upland pine	**>>>**	burned upland pine	**>>>**	field	>	hardwood drain	>	**feed trail buffer area**
2007	28	unburned upland pine	**>>>**	burned upland pine	**>>>**	hardwood drain	>	field	>	**feed trail buffer area**

analysis not completed for 2004

2nd Order Selection LATE Breeding Season

	n	High Rank								Low Rank
2001	4	sample size not large enough								
2002	29	**feed trail buffer area**	**>>>**	burned upland pine	>	unburned upland pine	>	field	>	hardwood drain
2003	7	**feed trail buffer area**	>	unburned upland pine	>	burned upland pine	>	field	>	hardwood drain
2005	13	**feed trail buffer area**	**>>>**	burned upland pine	**>>>**	unburned upland pine	>	field	>	hardwood drain
2006	24	**feed trail buffer area**	**>>>**	unburned upland pine	>	burned upland pine	>	field	**>>>**	hardwood drain
2007	19	unburned upland pine	>	**feed trail buffer area**	>	field	**>>>**	burned upland pine	>	hardwood drain

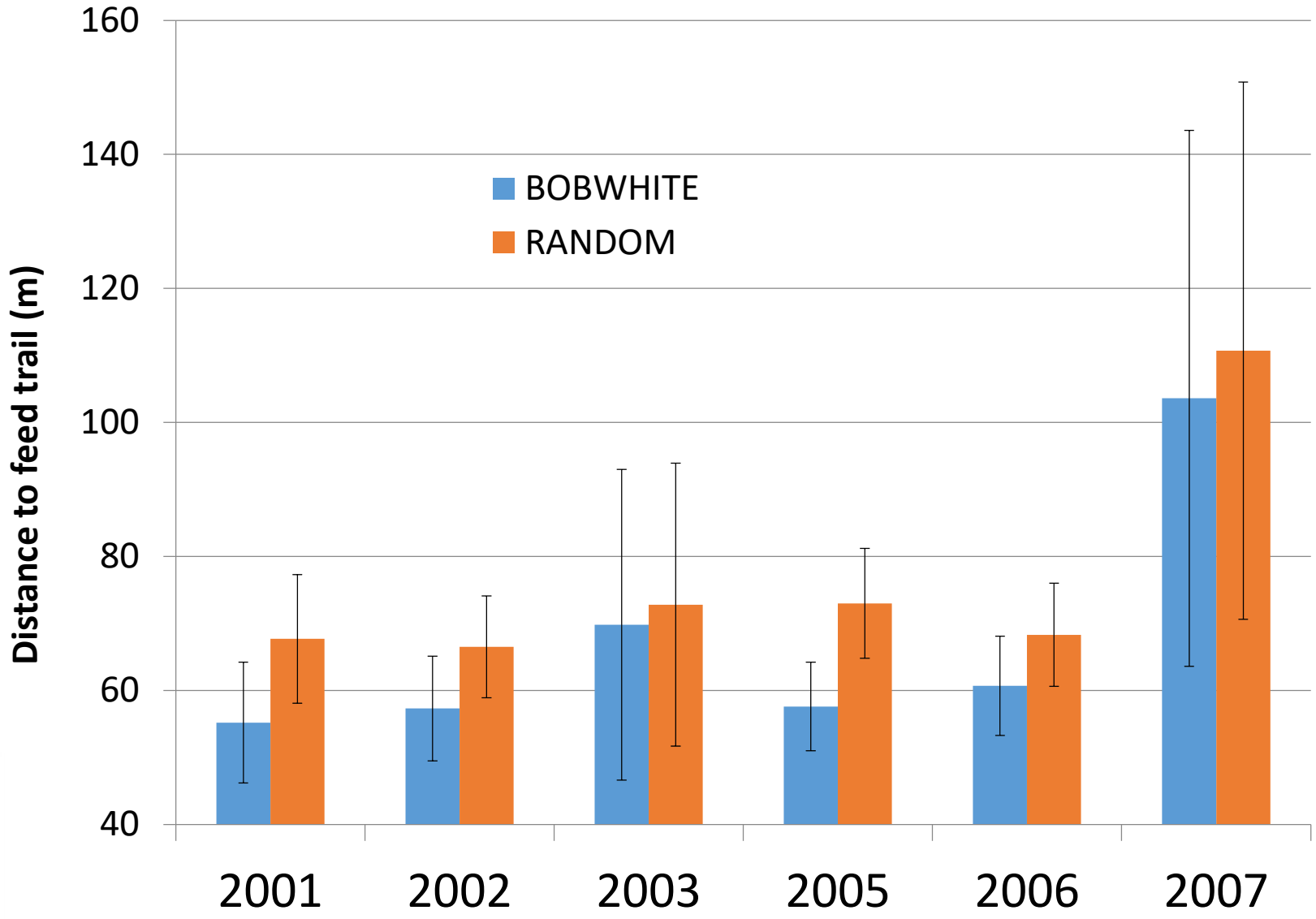
analysis not completed for 2004

3RD Order Selection LATE Breeding Season

	n	High Rank								Low Rank
2001	4	sample size not large enough								
2002	29	burned upland pine	>>>	unburned upland pine	>	feed trail buffer area	>	field	>	hardwood drain
2003	7	burned upland pine	>	unburned upland pine	>	feed trail buffer area	>	field	>	field
2005	13	burned upland pine	>	unburned upland pine	>>>	feed trail buffer area	>	field	>	hardwood drain
2006	24	burned upland pine	>	unburned upland pine	>>>	feed trail buffer area	>	field	>	hardwood drain
2007	19	burned upland pine	>	unburned upland pine	>>>	field	>>>	feed trail buffer area	>	hardwood drain

analysis not completed for 2004

Distance to feedline – random vs. bobwhite locations



CONCLUSIONS

- Breeding season home ranges were reduced and relatively consistent in size on the supplemental feed treatment area
- A 2nd Order selection preference for the feed trail in home range positioning within the Study Area
- Within home ranges, low selection preference for the feed trail

Take Home

On properties of similar habitats and management:

- Supplemental feeding may result in more efficient home ranges and space use during the breeding season
- May be especially important during the early breeding season due to reduced useable space from prescribed fires

THANK YOU:

- Members and Supporters of Tall Timbers
- Tall Timbers Board of Trustees
- Pamela H. Firman Quail Endowment
- Gerry Quail Endowment
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- Plantation owners and managers
- Clay Sisson and Theron Terhune

Questions?

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